



Appln No.: 09/924,279  
Applicant(s): Yuen-Foo Michael Kou  
METHOD AND APPARATUS FOR EVALUATING A SET OF  
ELECTRONIC COMPONENTS

Page 2 of 11

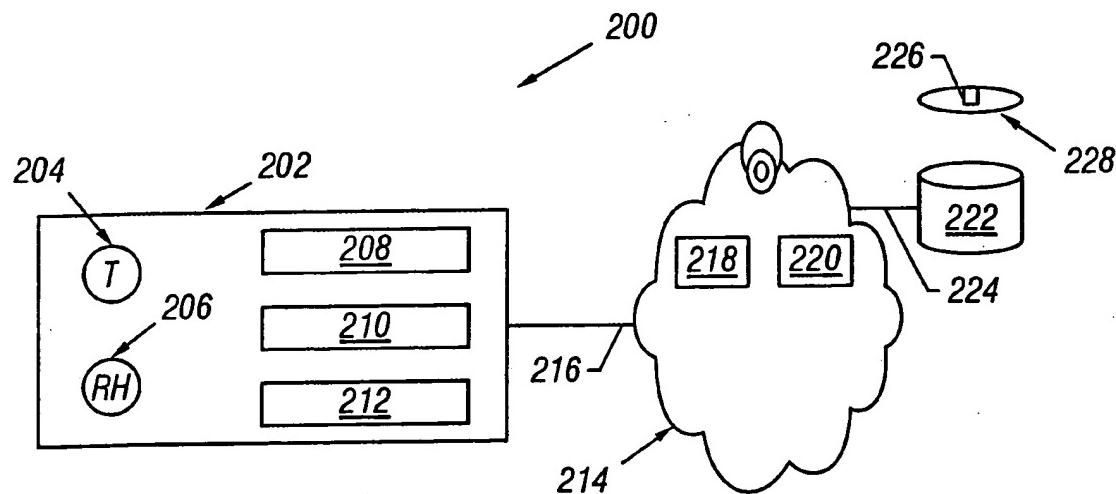


FIG. 2A

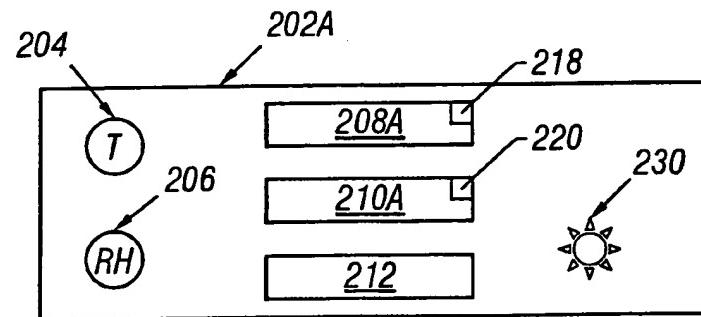


FIG. 2B

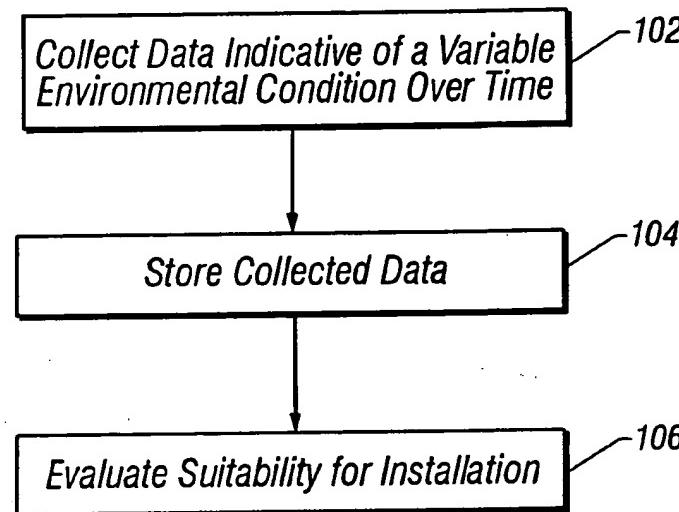


FIG. 1

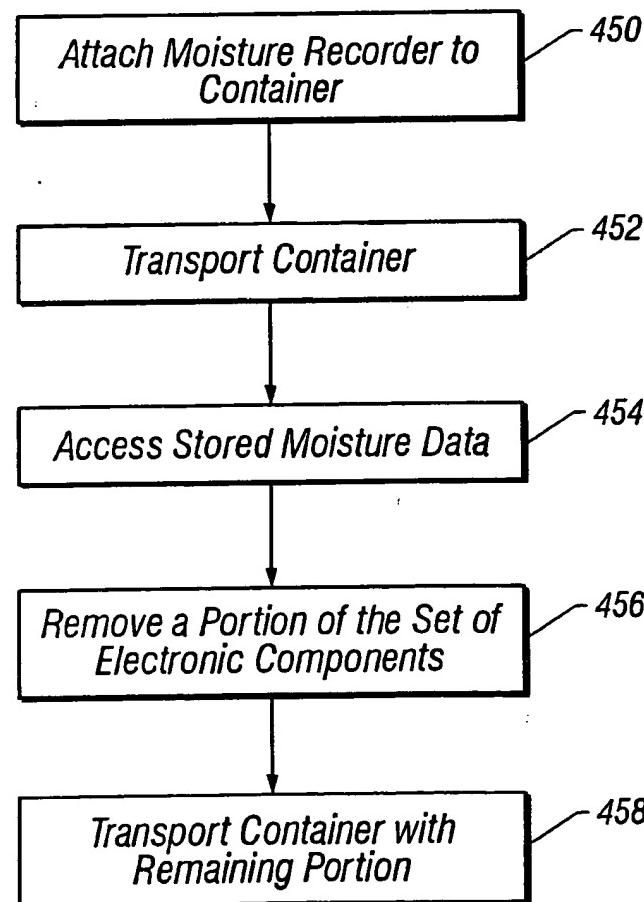
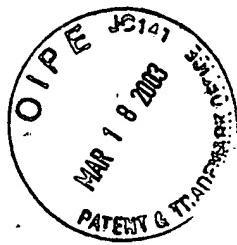
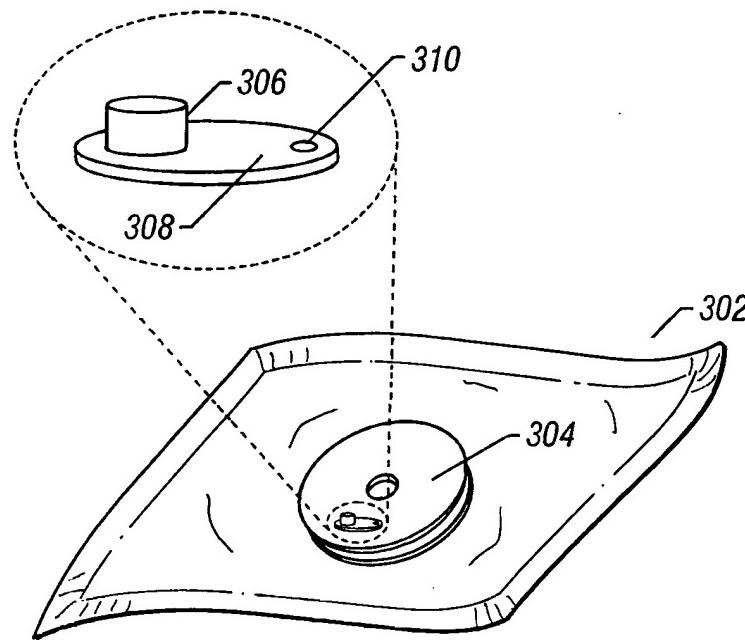


FIG. 4



Appln No.: 09/924,279  
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Page 3 o



**FIG. 3A**

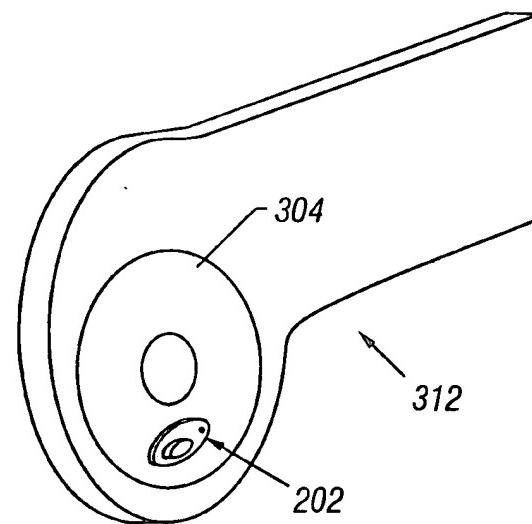
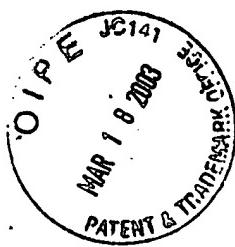


FIG. 3B

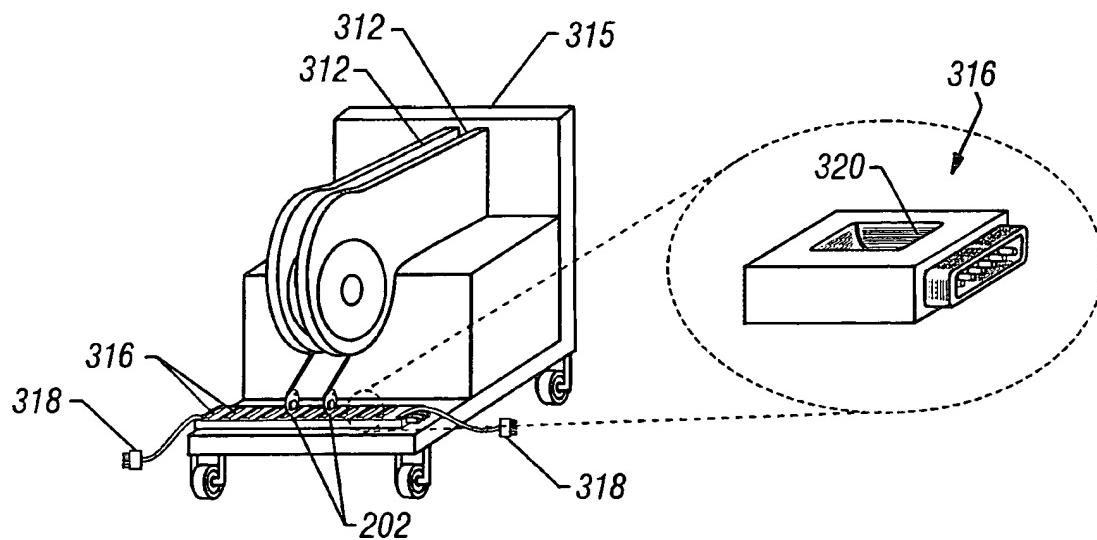
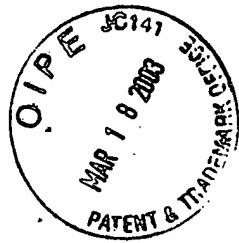


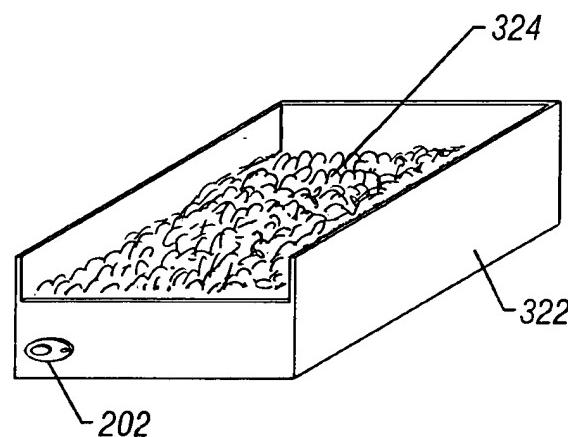
FIG. 3C



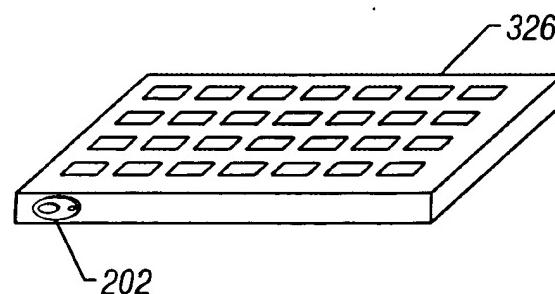
Appln No.: 09/924,279

Page 5 of 1

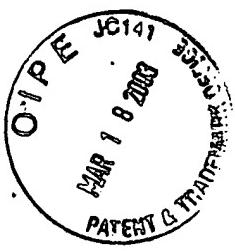
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**FIG. 3D**



**FIG. 3E**



Appln No.: 09/044,279

Page 6 of 11

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METHOD AND APPARATUS FOR EVALUATING A SET OF  
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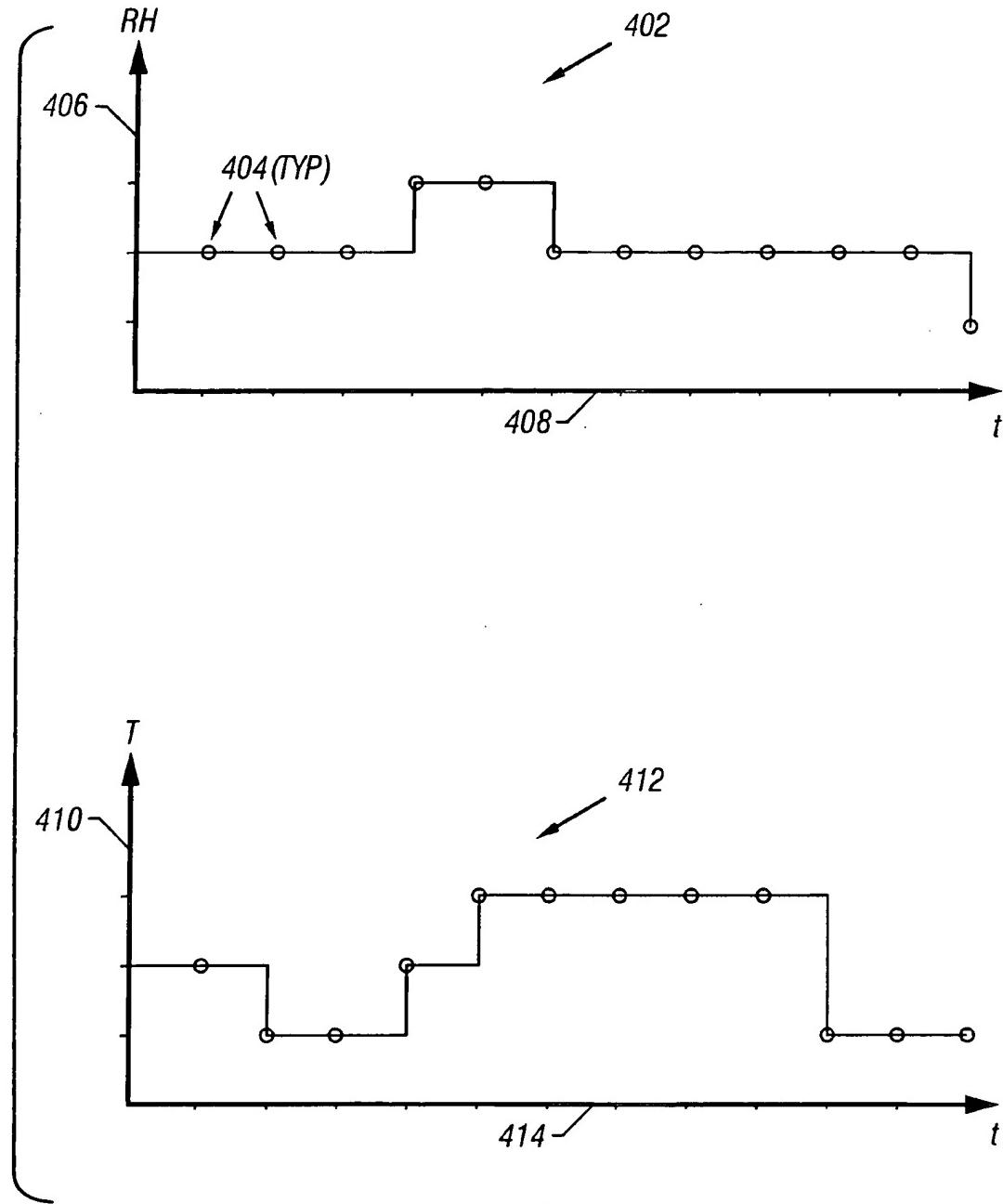


FIG. 5

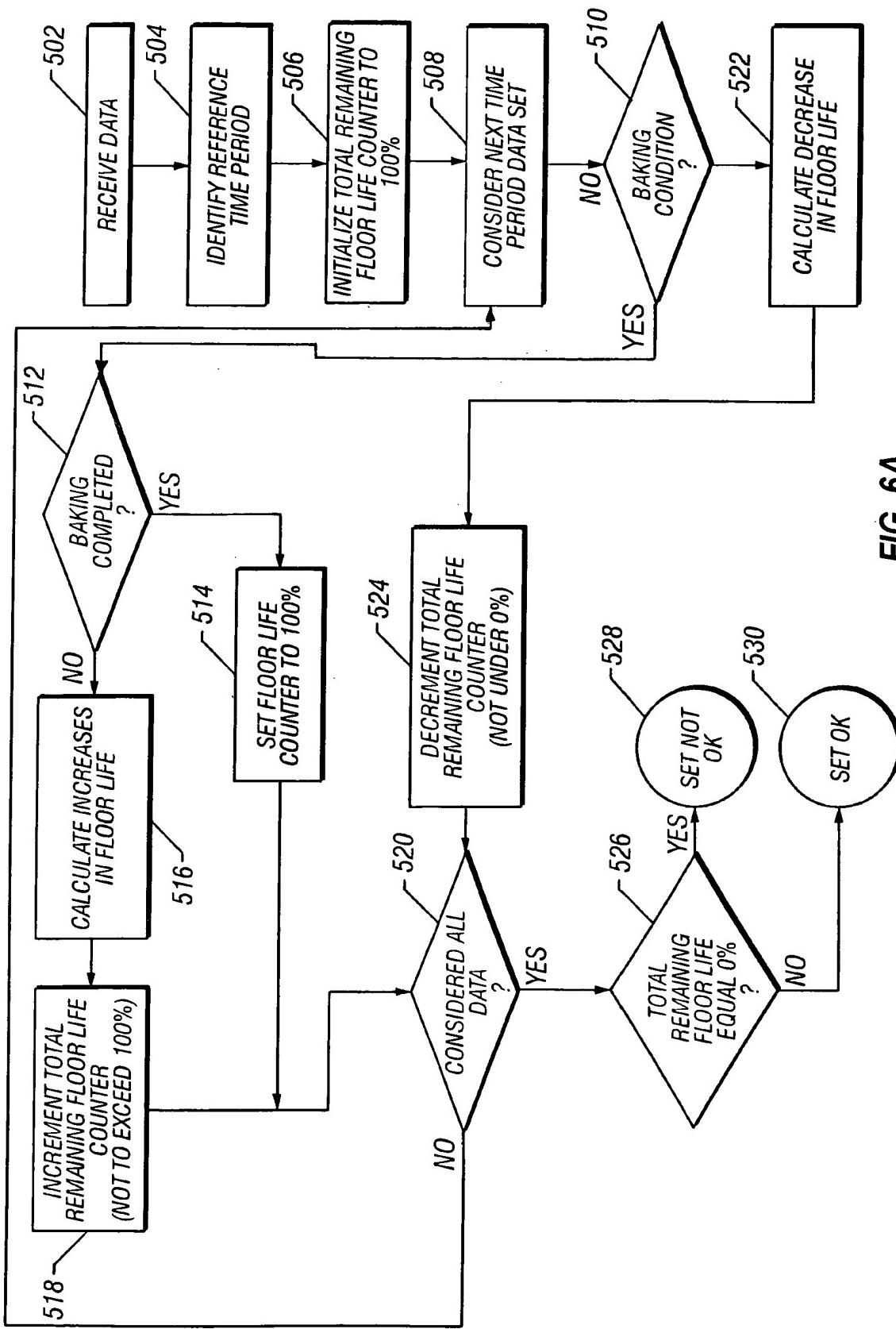
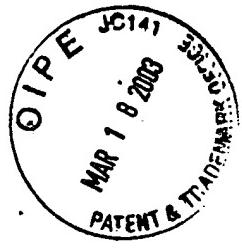


FIG. 6A

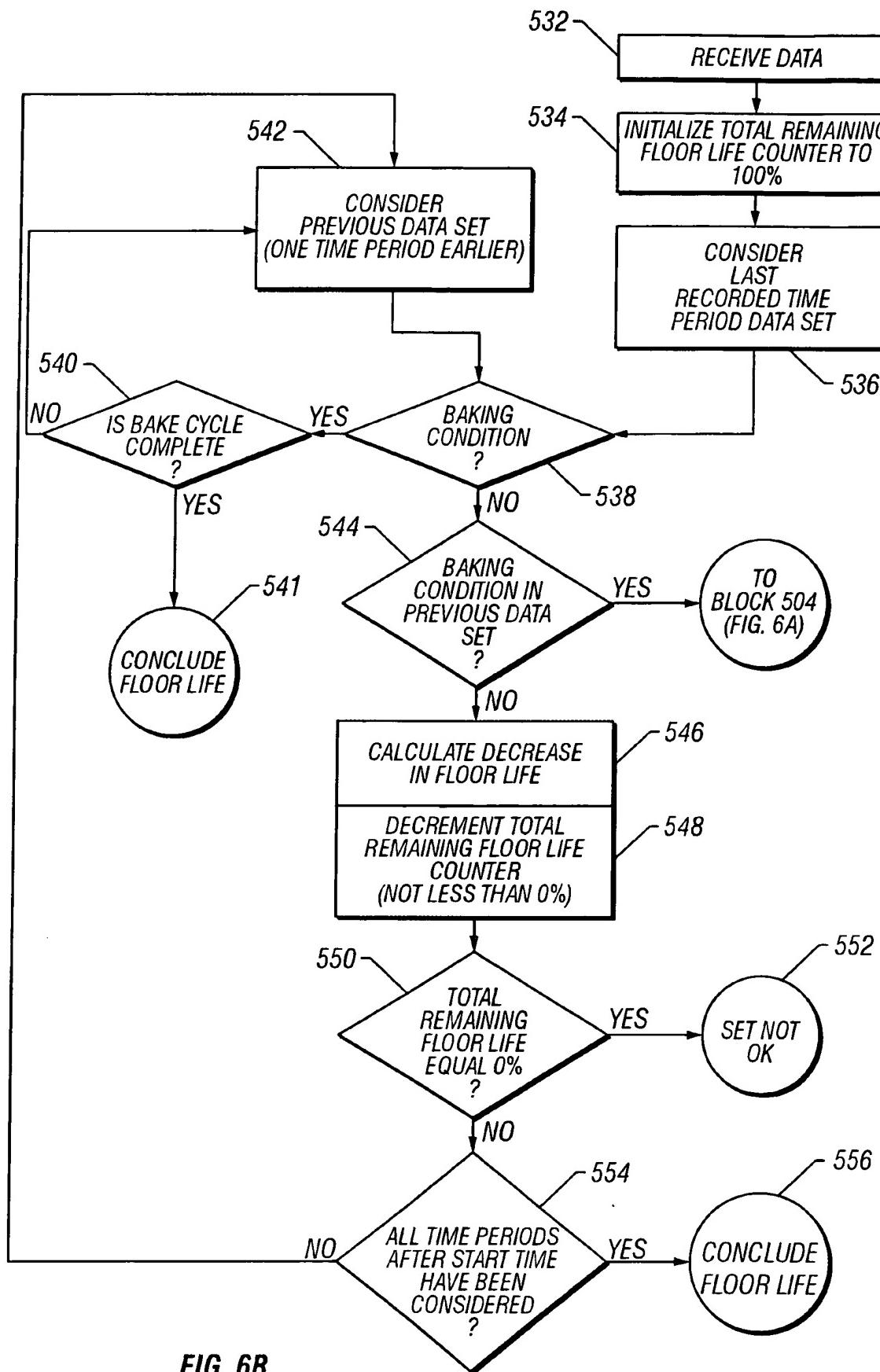
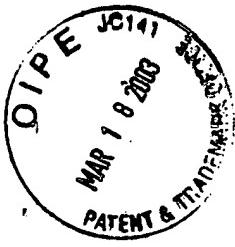


FIG. 6B



602

IPC/JEDEC J-STD-033

April 1999

TABLE 5 Recommended Equivalent Total Floor Life (days) @ 20°C, 25°C & 30°C  
 For ICs with Novolac, Biphenyl and Multifunctional Epoxies  
 (Reflow at same temperature at which the component was classified)

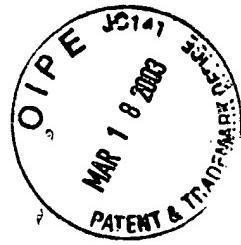
Body Thickness (t)	M.S.Level	Maximum Percent Relative Humidity										604
		20%	30%	40%	50%	60%	70%	80%	90%			
<i>t &gt; 3.1mm</i> <i>PQFPs &gt; 84 pins.</i> <i>PLCCs (square)</i> <i>MQFPs</i> <i>or PBGAs</i>	Level 2a	∞ ∞ ∞	60 53 69	41 42 57	33 36 47	28 14 19	10 14 19	7 10 13	6 8 10	30°C 25°C 20°C		
	Level 3	10 13 17	9 11 14	8 10 13	7 9 12	7 9 12	5 7 10	4 6 8	4 5 7	30°C 25°C 20°C		
	Level 4	4 5 7	4 5 7	4 5 7	3 4 6	3 4 5	3 3 4	2 3 4	2 3 4	30°C 25°C 20°C		
	Level 5	3 5 7	3 4 6	2 4 5	2 3 5	2 3 4	2 2 3	1 2 3	1 2 3	30°C 25°C 20°C		
	Level 5a	1 2 4	1 2 3	1 2 3	1 2 3	1 2 2	1 1 2	1 1 2	1 1 2	30°C 25°C 20°C		
<i>t ≤ 2.1mm</i> <i>t &lt; 3.1mm</i> <i>PLCCs (rectangular) 18-32 pins</i> <i>SOICs (wide body)</i> <i>SOICs ≥ 20 pins</i> <i>PQFPs ≤ 80 pins</i>	Level 2a	∞ ∞ ∞	∞ 148 ∞	86 51 69	39 37 49	28 6 8	4 6 8	3 4 5	2 3 4	30°C 25°C 20°C		
	Level 3	19 25 32	12 15 19	9 12 15	8 10 13	7 9 12	3 5 7	2 3 5	2 3 4	30°C 25°C 20°C		
	Level 4	5 7 9	4 5 7	4 5 6	3 4 6	3 4 5	2 3 4	2 2 3	1 2 3	30°C 25°C 20°C		
	Level 5	3 4 5	3 3 5	2 3 4	2 3 4	2 3 4	1 2 3	1 1 3	1 1 2	30°C 25°C 20°C		
	Level 5a	1 2 2	1 2 2	1 2 2	1 2 2	1 2 2	1 1 2	0.5 1 2	0.5 1 1	30°C 25°C 20°C		
<i>t &gt; 2.1mm</i> <i>TSOPs,</i> <i>SOICs &lt; 18 pins</i> <i>TQFPs or</i> <i>or TBGAs</i>	Level 2a	∞ ∞ ∞	∞ ∞ ∞	∞ ∞ ∞	∞ ∞ ∞	28 ∞ ∞	1 2 2	1 1 2	1 1 1	30°C 25°C 20°C		
	Level 3	∞ ∞ ∞	∞ ∞ ∞	∞ ∞ ∞	11 14 20	7 10 13	1 2 2	1 1 2	1 1 1	30°C 25°C 20°C		
	Level 4	∞ ∞ ∞	9 12 17	5 7 9	4 5 7	3 4 6	1 2 2	1 1 2	1 1 1	30°C 25°C 20°C		
	Level 5	13 18 26	5 6 8	3 4 6	2 3 5	2 3 4	1 2 2	1 1 2	1 1 1	30°C 25°C 20°C		
	Level 5a	3 5 6	2 3 4	1 2 3	1 2 2	1 2 2	1 1 2	0.5 1 1	0.5 1 1	30°C 25°C 20°C		

FIG. 7  
 (Prior Art)

608

610

606



802

Package thickness	Level	Bake@125°C	Bake@40°C $\leq$ 5%RH
$\leq 1.4\text{ mm}$	2a	4 hours	5 days
	3	7 hours	11 days
	4	9 hours	13 days
	5	10 hours	14 days
	5a	14 hours	19 days
$\leq 2.0\text{ mm}$	2a	18 hours	21 days
	3	24 hours	33 days
	4	31 hours	43 days
	5	37 hours	52 days
	5a	48 hours	68 days
$\leq 4.0\text{ mm}$	2a	48 hours	67 days
	3	48 hours	67 days
	4	48 hours	68 days
	5	48 hours	68 days
	5a	48 hours	68 days

Table 2 Reference Conditions for Drying Components that were Exposed to Conditions  $\leq$  60% RH  
(User Bake:Floor Life Begins Counting at Time = 0 after bake)

**FIG. 8**  
**(Prior Art)**

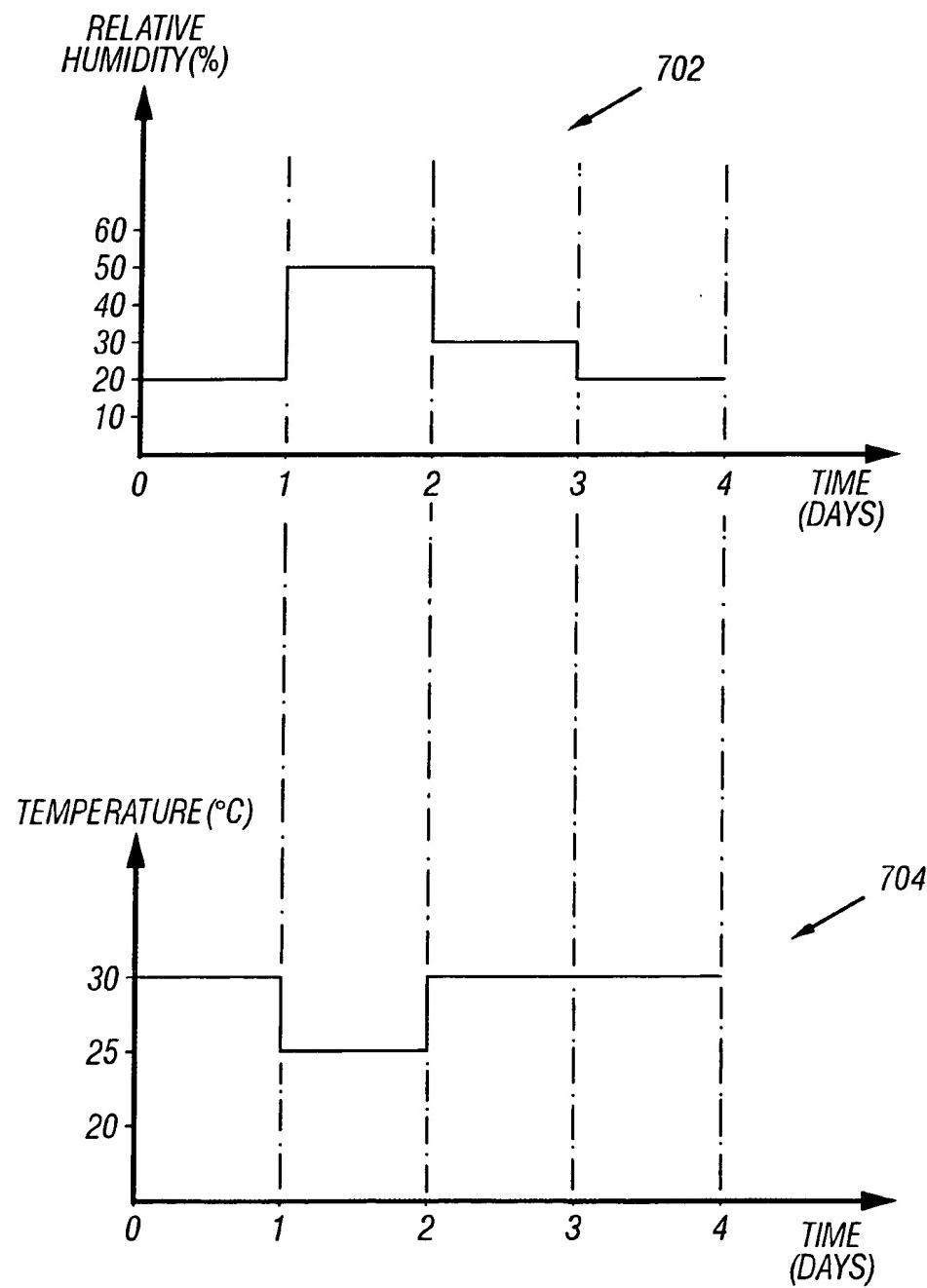
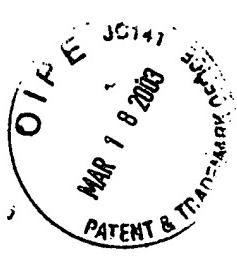


FIG. 9